



LIFE
CLIMATE
PATH
2050



ON THE WAY TO CLIMATE NEUTRALITY

Layman's report on the LIFE ClimatePath2050 project
(LIFE16 GIC/SI/000043)

The LIFE ClimatePath2050 project (LIFE16 GIC/SI/000043) is financed from the LIFE financial mechanism managed by the European Commission and from the Climate Change Fund of the Ministry of the Environment and Spatial Planning of the Republic of Slovenia



Project data



Title: Climate Path Towards the Mid-Century Climate Target

Acronym: LIFE ClimatePath2050

Contract number: LIFE16 GIC/SI/000043

Duration: 15 June 2017 – 14 December 2021


Budget: EUR 1,722,795

Financing: The project is financed in the amount of EUR 1,029,175 from the LIFE financial mechanism managed by the European Commission under the priority area Climate Governance and Information, and in the amount of EUR 343,057 from the Climate Change Fund of the Ministry of the Environment and Spatial Planning of the Republic of Slovenia

Project partners: Jožef Stefan Institute, Energy Efficiency Centre (JSI-EEC), lead partner
ELEK, d. o. o.
The Slovenian Forestry Institute (SFI)
The Building and Civil Engineering Institute ZRMK, d. o. o.
The Institute for Economic Research (IER)
The Agricultural Institute of Slovenia (AIS)
PNZ, d. o. o.

Website: <https://podnebnapot2050.si/?lang=en>





The LIFE ClimatePath2050 Project Contributes to the Achievement of the Paris Agreement Objectives

Climate change is one of the greatest challenges facing humanity. The period up to 2030 will be crucial for climate change mitigation. Analyses made in the *LIFE ClimatePath2050* project have shown that Slovenia has an opportunity to become a climate neutral country by the middle of the century.

The science at the global level confirms that global warming and thus climate change have been caused by humans. Some induced changes can no longer be prevented in the short term; however, our response is necessary to limit such changes as much as possible. We need to act immediately and significantly reduce CO₂ and other greenhouse gas (GHG) emissions.

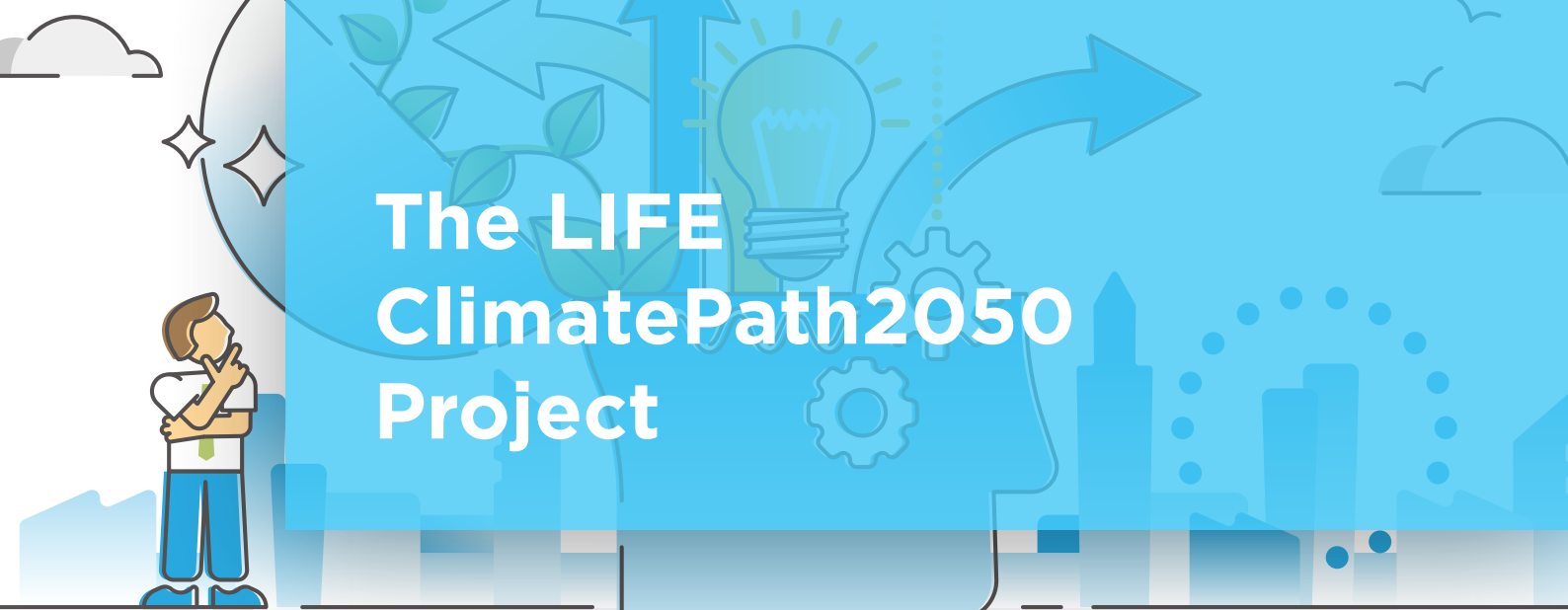
In the *LIFE ClimatePath2050* project, we analysed how successful we have been as regards climate change mitigation and how successful we can become in the future if we take appropriate action. Through expert analysis, we have enabled decision-makers, municipalities, and individuals to make better, climate- and environmentally friendly decisions. The project results were used for the preparation of the *Long-term Climate Strategy*, in which Slovenia has included climate neutrality as a goal by 2050. In order to achieve this, almost all sectors will have to reduce their emissions to a minimum, as failure to meet any of the sectoral targets would jeopardize the target of the whole country.

We can only successfully tackle climate change together: individuals, municipalities, ministries, companies – everyone must do their part. The policy must set clear

and professionally justified targets and prepare measures to achieve them. It has to decide what we will invest in, what will be subsidized, and what will be taxed. It must enact appropriate legislation and provide sufficient suitably qualified staff to implement climate policy. Others also need to approach climate challenges actively, by implementing measures and changing unsustainable habits at home and at work, as well as by their social activity in the community. The transition to climate neutrality can only be secured through good decisions, wise behaviour, and cooperation for our own benefit and the benefit of the planet and future generations.

Reducing greenhouse gas emissions does not benefit only our climate. The implementation of climate measures also has many other benefits. It entails:

- an opportunity to develop the local economy;
- lower energy consumption and thus lower costs;
- the creation of new green jobs;
- a reduction in particle pollution, which leads to better air quality and, consequently, to better health;
- a higher quality of life, etc.



The LIFE ClimatePath2050 Project

The *LIFE ClimatePath2050* project contributes to wise decisions on Slovenia's climate path. Improved systems for planning and for progress monitoring allow us to better understand the link between measures and future GHG emissions reduction and fulfilment of the commitments under the Paris Agreement.

As a member of the European Union, Slovenia is committed to following the objective of the Paris Agreement of holding the increase in global temperature to well below 2°C by reducing greenhouse gas emissions and pursuing efforts to limit the increase in temperature to 1.5°C above the pre-industrial period.

The European Union has set the target of reducing greenhouse gas emissions by at least 55% by 2030 and of reaching climate neutrality by the middle of this century.

The *LIFE ClimatePath2050* project was aimed at monitoring the progress and planning of climate measures for reducing GHG emissions in buildings, transport, industry, agriculture, forestry, and waste management. The project built on the development and upgrading of the already established system for the preparation of projections and for monitoring the implementation of measures.

Decision-making for implementation of the Paris Agreement

THE LONG-TERM LOW EMISSIONS STRATEGY

IMPLEMENTATION OF THE EXISTING MEASURES FOR GHG EMISSIONS REDUCTION

LIFE ClimatePath2050 Project

ANALYSES



ClimatePath2050: emissions reduction potentials, models, projections, impacts



Yearly Climate Action Mirror and Local Scoreboard: monitoring implementation

COOPERATION ON DECISIONS

Decision support for planning Slovenia's climate path based on emissions projections and the **implementation** of measures by monitoring progress



Project team at the start of the project in June 2017

In the *LIFE ClimatePath2050* project, we:

- prepared GHG emissions projections up to 2050 and assessed the impacts of scenarios for the *Long-term Climate Strategy of Slovenia*;
- upgraded the system for monitoring the implementation of measures for better climate governance and improved the accessibility of analyses for the upgrading of measures;
- through cooperation with decision-makers, ensured broader, better, and easier use of analyses in decision-making for climate action planning and implementation monitoring; and
- transferred selected results to the local level.



The project has greatly strengthened the network of experts who prepare GHG emissions projections and monitor them to support decision-making. We have built on the successful cooperation thus far, and new project partners, a number of external partners, and new employees have joined us. We have worked together on in-depth analyses of GHG emissions reduction options, on the development of a new generation of projection models, on the first analysis of GHG emissions reduction scenarios up to 2050, and on the establishment of a truly comprehensive system for monitoring progress in implementing measures.

We are satisfied that our results are useful, especially for decision-makers. We are pleased with the inclusion of all institutions responsible for the implementation of measures in Slovenia, of local communities, non-governmental organizations, companies, and other stakeholders. We would like to express our sincere appreciation to

everyone involved for their excellent cooperation and contributing to the project results! We are also proud that the results are interesting for the wider professional and interested public, that at times journalists could hardly wait for the Climate Action Mirror to be published, and that results are used by students, Eco School pupils, and even citizens, e.g. to substantiate their positions or initiatives submitted to the Government of the Republic of Slovenia.

We tried to show both the positive sides of the measures taken thus far and the gaps thereof. Both the opportunities and risks of future scenarios. The positive consequences as well as those less desired that will need to be mitigated. The aim of contributing to solid foundations enabling decisive action and to wise decisions for our climate will also be our guidance in the future.

Andreja Urbančič, Jožef Stefan Institute, Energy Efficiency Centre, LIFE ClimatePath2050 project manager



Would you also like to see the results of the *LIFE ClimatePath2050* project? The main project achievements are also summarized in a video entitled *Our Goal is Climate Neutrality*. You can view it by scanning the QR code or via the link <https://www.youtube.com/watch?v=u88TdQf-kUo>.



You can find more about how we plan climate measures, why background studies are needed, and who and what role has in the climate policy in a video entitled *Making Wise Decisions for our Climate*. You can view the video by scanning the QR code or via the link https://www.youtube.com/watch?v=PR1_QdGYZQY.



The Foundation of Good Planning are Projections

Long-term projections of greenhouse gas emissions have shown that Slovenia can reduce greenhouse gas emissions to almost zero and what choices we have along the way. Based on the scenario analysis, Slovenia has decided on its target: to achieve climate neutrality by 2050 and it included this in its *Long-term Climate Strategy*.

Projections make it possible to assess the impact of different decisions on future developments and are therefore a useful tool for decision-makers and all stakeholders involved in decision-making. The projections are not forecasts; they show how future emissions will change as important factors change. They are based on a simplified model of the real, complex world and assumptions about the future development of external factors and the implementation of measures.

The preparation of long-term projections is a crucial part of the overall analysis of GHG emissions reduction scenarios, which we carried out in the *LIFE ClimatePath2050*

project to support decision-making on Slovenia's climate targets by 2050. We started the whole process by scoping the analysis, and by designing GHG emissions reduction scenarios and criteria for the comparison thereof. This was followed by the preparation of projections of the external factors and projections of greenhouse gas emissions and assessment of their impacts. In this context, we:

- developed a new model for the preparation of GHG emissions and removals projections in the sector of land use, land-use change, and forestry (LULUCF), and a new macroeconomic model, and thoroughly revised and upgraded other sectoral models;



“

As part of the *LIFE ClimatePath2050* project, we have also adapted the Canadian Carbon Budget Model for Slovenia and used it for the first time to produce projections of GHG emissions and removals in the LULUCF sector. The model is based on knowledge of the forest age structure, growth curves, and assumptions about planned forest management. In order to maintain or increase the sinks that will be important for achieving climate neutrality in 2050

we need to devote more attention to measures for strengthening long-term forest resilience to climate change, reducing emissions from land-use change, and revitalising and developing wood processing. In 2050, this sector will be very important for offsetting emissions from agriculture that we will not be able to eliminate due to other strategic goals.

*Boštjan Mali,
The Slovenian Forestry Institute*

”



Steps in the analysis supporting the Long-term Climate Strategy

1 SCOPING THE ANALYSIS

setting criteria for the comparison of scenarios, the definition of scenarios, etc.

2 PROJECTIONS OF THE EXTERNAL FACTORS

economic activity, energy prices, etc.

3 PROJECTIONS OF GHG EMISSIONS

for various scenarios in line with more or less ambitious emissions reduction targets

4 ASSESSMENT OF THE IMPACTS

on employment, public spending, air pollutant emissions, sectoral objectives: energy security, food safety, etc.

5 DEVELOPING RECOMMENDATIONS

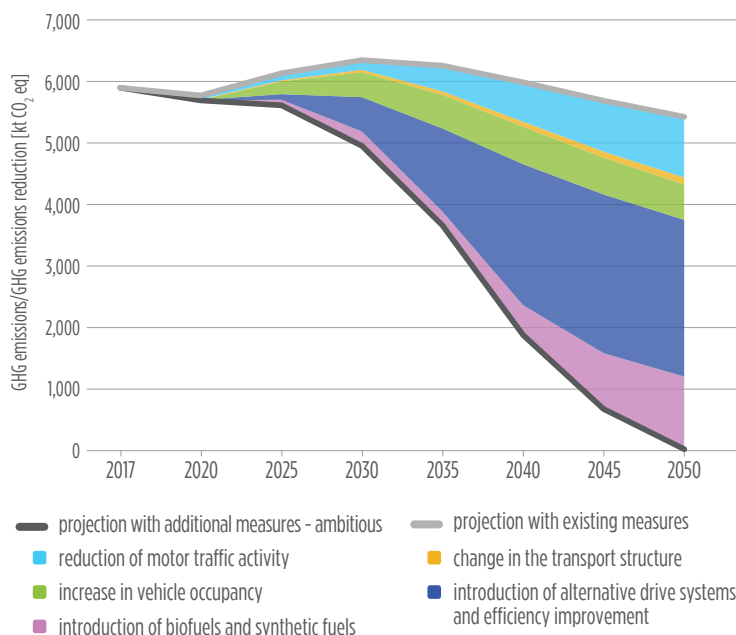
through a comparison of the scenarios, discussion of the results, and consultation

- analysed the GHG emissions reduction potentials in different areas (the use of renewable energy sources, efficient energy use in buildings and industry, district heating systems, mobility, etc.);
- with the help of all sectoral models, considering the present status, potential measures, and feasibility, designed and examined several possible ways – scenarios – and calculated projections for the reduction of greenhouse gas emissions up to 2050;
- assessed the impacts of scenarios on greenhouse gas emissions, energy use, air pollution emissions, required investments, energy cost savings, sectoral and macroeconomic development goals, etc.

In cooperation with the School of Economics and Business of the University of Ljubljana, we also assessed in the analysis of potentials the financial capacity of households for the energy renovation of buildings. At the current interest rates, 68% of households can potentially afford such renovation by borrowing, while almost a third of households are unable to do so.

GHG emissions projections with existing and additional measures and the contribution of measures to the reduction of emissions in transport


In the calculations, we considered all sectors with GHG emissions: transport, energy supply, industry, other sectors (residential, services), agriculture, waste management and land use, land-use change, and forestry.



Stakeholders participated in all phases of the preparation of the projections, with the exception of the design of the models and calculations. Based on the discussions at the workshops, we included them in the long-term projections preparation process in the design of scenarios, various assumptions, and in the discussion and interpretation of results that are important for decision-making on the long-term targets and directions of the Slovenian climate policy. The report on the analysis of the GHG emissions reduction scenarios was available to stakeholders as an official annex to the *Long-term Climate Strategy* at a public discussion. Among the possible targets, Slovenia has chosen to become climate neutral by 2050.

The results of the scenario analysis were used as the background for the preparation of several national documents, which represents a step forward in the coordinated preparation of the national policies. These documents are the following:

- *The Resolution on the Slovenian Long-term Climate Strategy up to 2050;*
- *The Integrated National Energy and Climate Plan of the Republic of Slovenia;*
- *The Long-term Strategy for the Energy Renovation of Buildings up to 2050;*
- *The National Air Pollution Control Programme.*



The Involvement of Stakeholders for Better Decision-making and the Implementation of Measures

The project has made an important contribution to the networking of experts, analysts, and decision-makers, as well as those responsible for the implementation of measures. This is crucial for the better design of measures for greenhouse gas emissions reduction and their better implementation in the transition to climate neutrality.

Analyses were prepared in close cooperation with stakeholders. An important part of the *LIFE ClimatePath2050* project was dedicated to the so-called coordination process, in which experts, who prepared background analyses (project partners), decision-makers, the general professional public, non-governmental organizations, municipalities, companies, and other interested parties participated and exchanged information.

Such cooperation and the exchange of information took place mainly within various workshops and events during

the preparation of the Climate Action Mirrors as well as of the GHG emissions projections for the *Long-term Climate Strategy*. Stakeholders were consulted at various stages of the analyses, during their design, and in the presentation of results and the preparation of recommendations. We organized 40 events aimed at involving stakeholders in the preparation of analytical bases, with more than 1,400 participants from 200 different organizations. In addition, we prepared 15 other events aimed at disseminating the project results among local communities, the international public, and elsewhere.

“

Background studies need to be prepared in a transparent and coordinated manner. Often, not all of the latest information is available to those preparing analyses, and vice versa, decision-makers and others often do not know where to obtain certain data and analyses and how to use (interpret) them correctly. Therefore, as many stakeholders as

possible should be involved in the process of preparing the background studies. In the coordination process of the *LIFE ClimatePath2050* project, stakeholders connected in a strong network that uses the results of the emissions projections and of monitoring the implementation of climate actions.

Katarina Trstenjak, Jožef Stefan Institute, Energy Efficiency Centre”



Consultations on the Analysis for the Preparation of GHG Emissions Reduction Projections

Cooperation with stakeholders took place during the entire process of preparing the analysis and projections for the reduction of GHG emissions:

- 12 workshops on the potential for reducing GHG emissions in different fields (e-mobility, shallow geothermal energy, district heating systems, etc.);
- 8 workshops for scoping the scenario analysis, which, *inter alia*, brought to Slovenia a vision of climate neutrality;
- 3 workshops within the preparation of the projections of external factors, where smaller groups of experts in the fields of energy prices, economic growth, and transport activity participated;
- 10 workshops presenting the results of the analyses, which were intended for discussion with different stakeholders.

Participation in the Preparation of the Climate Action Mirrors

Stakeholders were also intensively involved in the preparation of three Climate Action Mirrors. At a total of 9 workshops and events, they exchanged information, co-formulated recommendations, and discussed the main findings of the Climate Action Mirrors and the Local Climate Action Scoreboard. For the measures in focus: supporting energy poverty prevention, district heating systems, sustainable mobility, etc., the workshops linked discussions on the current barriers to implementation and the prospects for implementation by 2030 and in the long-term.

By means of an inclusive approach, we achieved several project objectives. Decision-makers use background analyses more often (than before the project), and transparency in monitoring progress, knowledge of available data, and the accessibility of analyses have also improved. Also very important are the connections established among experts, which helps to achieve the targets.



Climate Path 2050: <https://podnebnapot2050.si/results-for-slovenia/life-climate-path-2050/?lang=en>

Events: <https://podnebnapot2050.si/kategorija/library-en/arhiv-dogodkov-en/?lang=en>



We Monitor the Implementation of Measures through the Climate Action Mirrors

The Climate Action Mirrors show us, through analyses and guidance, how we need to improve current measures for reducing greenhouse gas emissions.

In order to mitigate climate change, Slovenia has binding targets regarding the reduction of GHG emissions. Achievement of the targets is based on the implementation of concrete measures in different sectors and incentive measures at the national level. Progress in implementation of measures needs to be constantly monitored, and measures need to be adjusted and supplemented, if needed. Only in this manner can activities be well directed and the implementation of existing measures upgraded. A cycle of continuous improvement ('plan-do-check-act') is crucial for achieving the set targets.

Examples of Measures

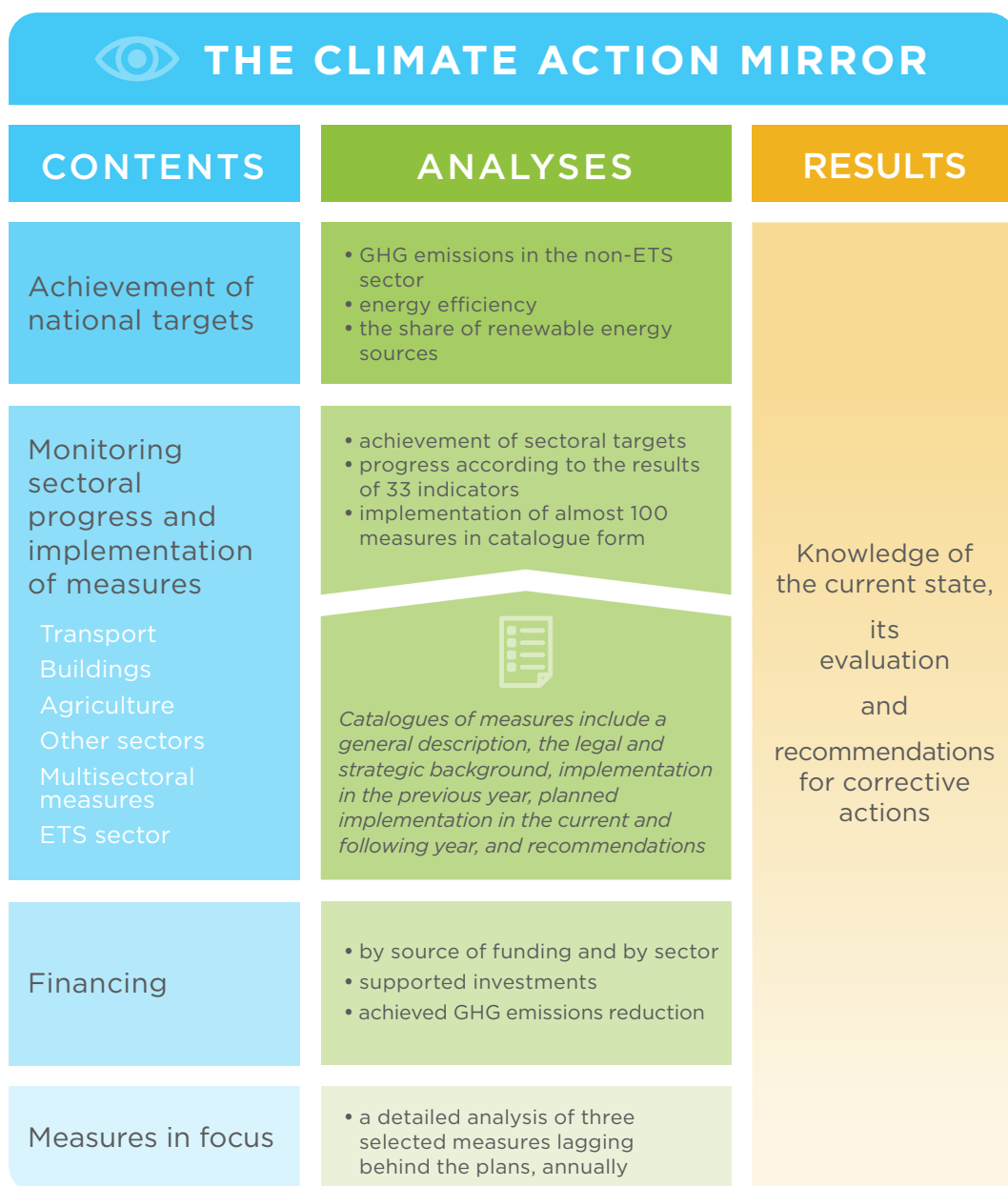
- concrete measures in different sectors: the energy renovation of buildings; the use of bicycles, public transport, or other modes of transport with lower emissions; the proper feeding of animals; waste reduction and separation, etc.;
- incentive measures at the national level: subsidies, taxes, regulations, infrastructure construction, training, achieving an understanding of measures, planning, etc.

In the *LIFE ClimatePath2050* project, we monitored the implementation of measures for the reduction of GHG emissions at the national level in the annual Climate Action Mirrors. The aim of the Mirrors was to provide accessible quality information for decision-making in one place. In the project, three Climate Action Mirrors were published, in 2018, 2019, and 2020. Each Mirror consists of several volumes, the

most important of which is a summary for decision-makers. The summary highlights the main conclusions of monitoring, together with recommendations for better guidance of measures. In order to support the implementation of measures that lag behind the plans, we have put three measures into focus each year and analysed them in detail.

The main highlights of the Climate Action Mirror preparation process are presented below.

- The Mirrors were prepared in three annual cycles, enabling them to be developed according to the needs of users.
- We included a wide network of experts in the review and evaluation of the collected data and information.
- Good cooperation with the stakeholders who implement climate actions was essential for the preparation of the Mirrors. Thereby, we:
 - contributed to the exchange of experience and information;
 - involved stakeholders in the preparation of recommendations for the short-term improvement of measures;
 - encouraged policymakers to use the available analyses and results more, in order to track the progress of the implementation of climate actions.
- The Mirrors are a good basis for climate-related monitoring and reporting under the decarbonization and energy efficiency dimensions of the *Slovenian National Energy and Climate Plan (NECP)*.



“

The information available in the Climate Action Mirrors is important and often used by the Ministry of the Environment and Spatial Planning. Namely, it provides the most comprehensive picture of the current state of climate change mitigation actions and useful recommendations for their further guidance. Based on the information from the Climate Action Mirrors, we also prepare annual

reports on the implementation of the *Operational Programme for Reducing GHG Emissions until 2020*. In the future, proper and continuous monitoring will be crucial for effective climate governance. The work started in the project is continuing with the Climate Action Mirrors in 2021 and 2022.

Martin Batič, Ministry of the Environment and Spatial Planning

”

The Local Scoreboard Assists Municipalities in Planning and Implementing Measures

Local communities are among the key actors in ensuring a responsible attitude towards the environment and the transition to climate neutrality. In the *LIFE ClimatePath2050* project, we help municipalities make wise decisions regarding GHG emissions reduction through the Local Climate Action Scoreboard and the planning support tool named Dashboard.

Tools Supporting the Local Planning of Climate Actions

In order to achieve Slovenia's climate neutrality by 2050, it is also crucial to properly plan climate actions at

the local level. In planning, which must be coordinated with planning at the national level, we also support municipalities with the tools prepared in the *LIFE ClimatePath2050* project.



“

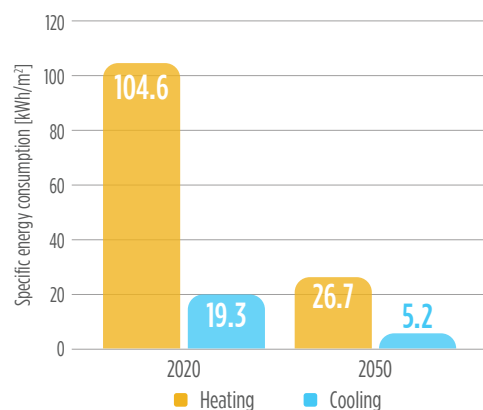
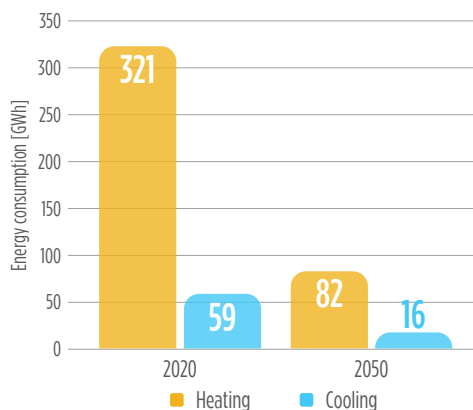
The aim of the Dashboard (Preglednik) planning tool is to provide local communities insight into the calculations for the national projections of greenhouse gas emissions up to 2050, which are transferred to the local level. We want to encourage municipalities to use the data in the preparation of their own climate and energy plans, i.e. also in

the planning of energy efficiency and renewable energy measures, especially in the preparation of local energy concepts. The Dashboard includes the modules Dashboard Buildings and Dashboard Vehicles, and the basic user interface is a window with data and charts.

*Gašper Stegnar,
Jožef Stefan Institute,
Energy Efficiency Centre*

”

Energy use and specific energy use for heating and cooling in 2020 and 2050 from the module Dashboard Buildings (the example presents single- and two-family houses in Ljubljana)



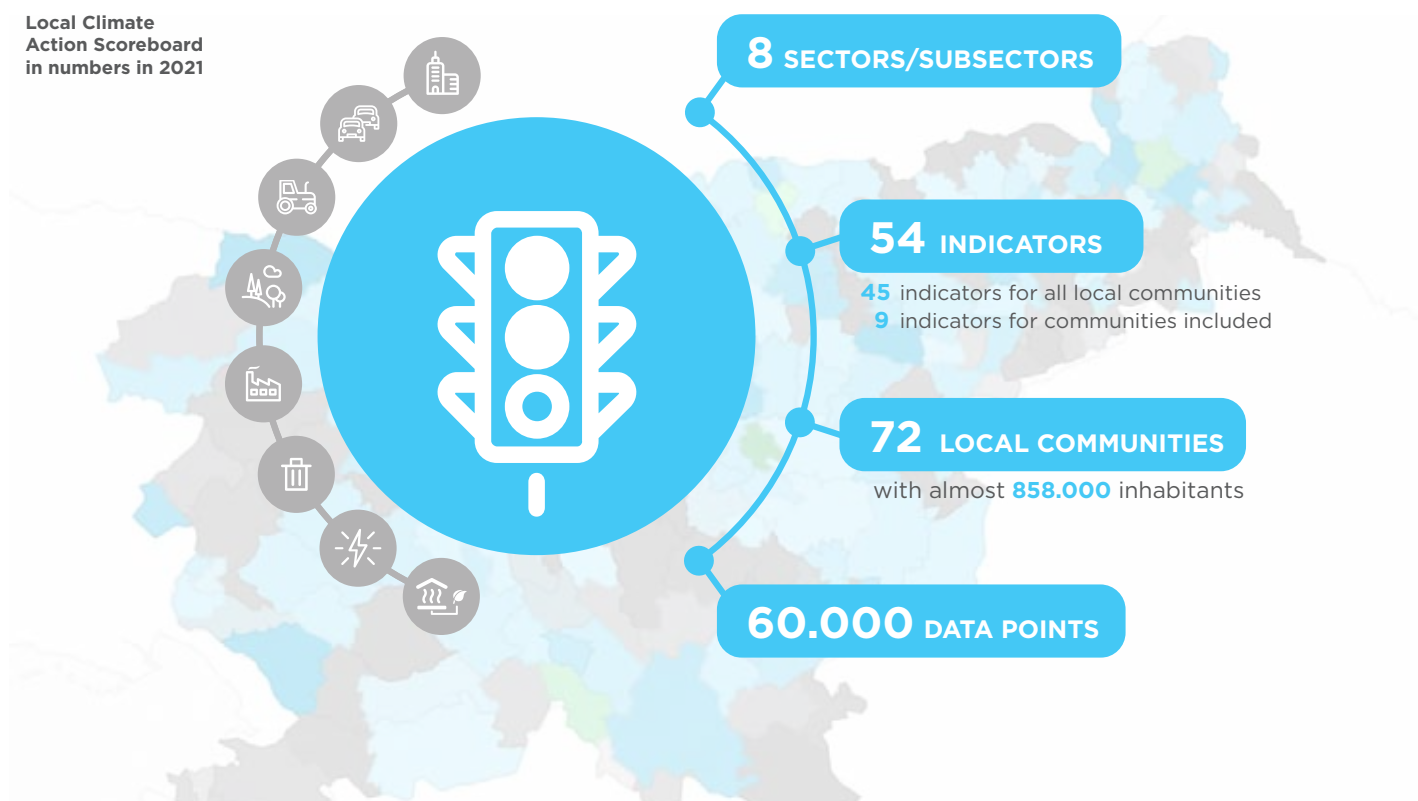
The Local Climate Action Scoreboard

The planning of climate actions alone is, of course, not enough to reduce GHG emissions; planned measures also need to be implemented. As municipalities are already implementing many climate actions, the Local Climate Action Scoreboard was also developed in 2018 as part of the *LIFE ClimatePath2050* project. The Scoreboard provides better insight into municipal activities in different fields of the implementation of measures for reducing GHG emissions. The following participated in the development and testing of the Scoreboard: the Goriška Local Energy Agency (GOLEA) and the following municipalities (some of which are urban municipalities): Ajdovščina, Divača, Grosuplje, Ivančna Gorica, Koper, Kranj, Maribor, Miren – Kostanjevica, Moravče, and Nova Gorica.

The Local Climate Action Scoreboard:

- is a free online application that encourages local communities to implement and monitor climate-related activities;
- displays information on the implementation of climate actions in municipalities on a map of Slovenia, and by means of diagrams and tables;
- enables access to and the export of data for independent analyses, thus supporting comprehensive local planning, especially in the preparation of local energy concepts;
- encourages local communities to track their progress in implementing climate actions;
- enables a comparison among municipalities and encourages the exchange of good practices.

Local Climate Action Scoreboard in numbers in 2021



Local Planning Tool Dashboard: <https://podnebnapot2050.si/results-for-local-communities/the-local-planning-tool-dashboard/?lang=en>

Local Climate Action Scoreboard: <https://podnebnapot2050.si/results-for-local-communities/local-climate-action-scoreboard/?lang=en>

The LIFE ClimatePath2050 Project in Numbers – Supporting Slovenia in Decision-making



Project partners



Jožef Stefan Institute, Ljubljana, Slovenia
Energy Efficiency Centre

Jožef Stefan Institute,
Energy Efficiency Centre,
lead partner

<https://ceu.ijs.si/en/>



ELEK, d. o. o.

<http://www.elek.si/e-0000.html>



GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE

The Slovenian
Forestry Institute

<https://www.gozdis.si/en/>



The Building and Civil Engineering
Institute ZRMK, d. o. o.

<https://gi-zrmk.si/en/>



Inštitut za ekonomska raziskovanja
Institute for Economic Research

The Institute for
Economic Research

<http://www.ier.si/>



Agricultural Institute of Slovenia

The Agricultural
Institute of Slovenia

<https://www.kis.si/en/>



PNZ, d. o. o.

<http://www.pnz.si/en/>

External contractors also participated in the *LIFE ClimatePath2050* project
<https://podnebnapot2050.si/o-projektu/zunanji-izvajalci/>.



LIFE ClimatePath2050
<https://podnebnapot2050.si/?lang=en>



Climate Path 2050
<https://podnebnapot2050.si/results-for-slovenia/life-climate-path-2050/?lang=en>



Annual Climate Action Mirror
<https://podnebnapot2050.si/results-for-slovenia/annual-climate-action-mirror/?lang=en>



Local Climate Action Scoreboard
<https://podnebnapot2050.si/results-for-local-communities/local-climate-action-scoreboard/?lang=en>



Local Planning Tool Dashboard
<https://podnebnapot2050.si/results-for-local-communities/the-local-planning-tool-dashboard/?lang=en>

ON THE WAY TO CLIMATE NEUTRALITY

Editor	Barbara Petelin Visočnik, JSI-EEC
Text authors	Barbara Petelin Visočnik, Andreja Urbančič, Katarina Trstenjak Gašper Stegnar (all JSI-EEC)
Photographs	Shutterstock; pages 3, 6 and 10: Boštjan Selinšek; page 3: Igor Ribič; page 4: Boštjan Mali – personal archive; page 7: Marjan Verč and JSI-EEC archive; page 9: BIA archive
English language editing	Dean J. DeVos
Design	Kraft&Werk
Layout	MullenLowe Avanta
Date	November 2021